

## CLAIMS

1 1. A method of producing constructed fares that includes  
2 an arbitrary added to a published fare, said method executed in a  
3 computer system, the method comprising:

4 determining interior cities that appear with gateway  
5 cities in arbitraries for the airline;

6 searching for gateway cities corresponding to the  
7 determined interior cities appearing in the arbitraries; and

8 applying an arbitrary corresponding to one of the  
9 interior cities to a published fare involving one of the gateway  
10 cities to produce the constructed fare.

1 2. The method of claim 1 wherein determining interior  
2 cities comprises:

3 accessing a hash table by an airline, interior-city  
4 pair to return a list of gateway cities for which an airline has  
5 arbitraries that specify the interior city.

1 3. The method of claim 2 wherein accessing a hash table  
2 returns the list in constant time.

1 4. The method of claim 1 wherein searching for gateway  
2 cities comprises:

3 accessing a hash table by an airline, gateway pair to  
4 return a list of gateway cities that an airline publishes fares  
5 from the determined gateway to another gateway city.

1 5. The method of claim 1 wherein determining interior  
2 cities comprises:

3 accessing a first hash table by an airline, interior-  
4 city pair to return a list of gateway cities for which an airline  
5 has arbitraries that specify the interior city; and

6 wherein searching for gateway cities comprises:

7       accessing a second hash table by an airline, gateway  
8 pair to return a second list of gateway cities that an airline  
9 publishes fares from the determined gateway to another gateway  
10 city.

1       6.       The method of claim 5 wherein accessing the first and  
2 second hash table returns the lists in constant time.

1       7.       The method of claim 1 wherein applying arbitraries  
2 further comprises:

3       evaluating records from fare construction tables to  
4 determine whether the constructed fare is a valid constructed  
5 fare.

1       8.       The method of claim 1 wherein the method is conditioned  
2 to allow any one or more of an airline code, interior city a  
3 first gateway city a second gateway city, or fare-basis to vary.

1       9.       The method of claim 7 wherein testing entries further  
2 comprises:

3       determining if an entry in a construction table was  
4 memoized before accessing the construction table; and

5       if the entry was memoized, retrieving an answer from a  
6 store of memoized entries to apply to the constructed fare.

1       10.      The method of claim 1 wherein the constructed fare is a  
2 two component constructed fare.

1       11.      The method of claim 1, further comprising:

2       determining a second set of interior cities that appear  
3 with a second gateway city in the published fare for the airline;

4           applying a second interior city from the second set of  
5 interior cities to the constructed fare to produce a three  
6 component constructed fare.

1       12.       The method of claim 1 wherein the method is performed  
2 over all determined interior cities and all gateways.

1       13.       The method of claim 1 wherein the method is performed  
2 over all airlines.

1       14.       A method of producing a set of constructed  
2 international fares for an airline, the method executed in a  
3 computer system and the method comprising:  
4           determining interior cities that appear with gateway  
5 cities in arbitraries for the airline;  
6           searching for gateway cities corresponding to the  
7 determined interior cities appearing in the arbitraries; and  
8           applying each arbitrary corresponding to each of the  
9 determined interior cities to published fares involving the  
10 gateway cities to produce the set of constructed fares.

1       15.       The method of claim 14 wherein the set of constructed  
2 fares are two component constructed fares.

1       16.       The method of claim 14 further comprising:  
2           determining a second set of interior cities that appear  
3 with second gateway cities in the published fares.

1       17.       The method of claim 15 wherein the set of constructed  
2 fares is a first set of constructed fares and the method further  
3 comprises:  
4           applying each arbitrary corresponding to each of the

determined second set of interior cities to the first set of constructed fares to produce a second set of constructed fares.

18. The method of claim 14 wherein the first set of constructed fares are two component constructed fares and the second set of constructed fares are three component constructed fares.

19. The method of claim 14 further comprising:  
evaluating entries in fare construction tables to determine whether constructed fares in the set of constructed fares are valid constructed fares; and  
returning the valid constructed fares as the set of constructed fares.

20. The method of claim 19 wherein evaluating entries further comprises:  
determining if an entry in a fare construction table was memoized before accessing the fare construction table; and  
if the entry was memoized, retrieving an answer from a store of memoized entries to apply to the constructed fare.

21. The method of claim 14 wherein determining interior cities comprises:  
accessing a first hash table by an airline, interior-city pair to return a list of gateway cities for which an airline has arbitraries that specify the interior city; and  
wherein searching for gateway cities comprises:  
accessing a second hash table by an airline, gateway pair to return a second list of gateway cities that an airline publishes fares from the determined gateway to another gateway city.

1 22. A computer program product residing on a computer  
2 readable medium, for producing constructed fares that includes an  
3 arbitrary added to a published fare, comprising instructions for  
4 causing a computer system to:

5 determine interior cities that appear with gateway  
6 cities in arbitraries for the airline;

7 search for gateway cities corresponding to the  
8 determined interior cities appearing in the arbitraries; and

9 apply an arbitrary corresponding to one of the interior  
10 cities to a published fare involving one of the gateway cities to  
11 produce the constructed fare.

1 23. The computer program product of claim 22 wherein  
2 instructions that cause a computer to determine interior cities  
3 comprises:

4 accessing a hash table by an airline, interior-city  
5 pair to return a list of gateway cities for which an airline has  
6 arbitraries that specify the interior city.

1 24. The computer program product of claim 23 wherein  
2 instructions that cause a computer to access a hash table returns  
3 the list in constant time.

1 25. The computer program product of claim 22 wherein  
2 instructions that cause a computer to search for gateway cities  
3 comprises instructions that cause a computer to:

4 access a hash table by an airline, gateway pair to  
5 return a list of gateway cities that an airline publishes fares  
6 from the determined gateway to another gateway city.

1 26. The computer program product of claim 22 wherein  
2 instructions that cause a computer to determine interior cities  
3 comprises instructions that cause a computer to:

4 access a first hash table by an airline, interior-city  
5 pair to return a list of gateway cities for which an airline has  
6 arbitraries that specify the interior city; and

7 wherein instructions that cause a computer to  
8 search for gateway cities comprises instructions that cause a  
9 computer to:

10 access a second hash table by an airline, gateway  
11 pair to return a second list of gateway cities that an airline  
12 publishes fares from the determined gateway to another gateway  
13 city.

1 27. The computer program product of claim 26 wherein  
2 instructions that cause a computer to access the first and second  
3 hash table returns the lists in constant time.

1 28. The computer program product of claim 22 wherein  
2 instructions that cause a computer to apply arbitraries further  
3 comprises instructions that cause a computer to:

4 test entries in construction tables to determine  
5 whether the constructed fare is a valid constructed fare.

1 29. The computer program product of claim 28 wherein  
2 instructions that cause a computer to test entries further  
3 comprises instructions that cause a computer to:

4 determine if an entry in a construction table was  
5 memoized before accessing the construction table; and

6 if the entry was memoized, retrieve an answer from a  
7 store of memoized entries to apply to the constructed fare.

1 30. The computer program product of claim 22 wherein the  
2 constructed fare is a two component constructed fare.

1 31. The computer program product of claim 22 wherein the  
2 computer program product is conditioned to allow any one or more  
3 of an airline code, interior city, a first gateway city, a second  
4 gateway city, or fare-basis to vary.

1 32. The computer program product of claim 22, further  
2 comprising instructions that cause a computer to:  
3 determine a second set of interior cities that appear  
4 with a second gateway city in the published fare for the airline;  
5 and

6 apply a second interior city from the second set of  
7 interior cities to the constructed fare to produce a three  
8 component constructed fare.

1 33. The computer program product of claim 22 wherein the  
2 computer program product is executed over all determined interior  
3 cities and all gateways.

1 34. The computer program product of claim 22 wherein the  
2 computer program product is executed over all airlines.

3 35. A computer program product for producing a set of  
4 constructed international fares for an airline, the computer  
5 program product residing on a computer readable medium and  
6 comprising instructions that cause a computer to:

7 determine interior cities that appear with gateway  
8 cities in arbitraries for the airline;

9 search for gateway cities corresponding to the  
10 determined interior cities appearing in the arbitraries; and

11           apply each arbitrary corresponding to each of the  
12 determined interior cities to published fares involving the  
13 gateway cities to produce the set of constructed fares.

1     36.       The computer program product of claim 35 wherein the  
2 set of constructed fares are two component constructed fares.

1     37.       The computer program product of claim 35 further  
2 comprising instructions that cause a computer to:  
3           determine a second set of interior cities that appear  
4 with second gateway cities in the published fares.

1     38.       The computer program product of claim 36 wherein the  
2 set of constructed fares is a first set of constructed fares, and  
3 the computer program product further comprises instructions that  
4 cause a computer to:

5           apply each arbitrary corresponding to each of the  
6 determined second set of interior cities to the first set of  
7 constructed fares to produce a second set of constructed fares.

1     39.       The computer program product of claim 35 wherein the  
2 first set of constructed fares are two component constructed  
3 fares and the second set of constructed fares are three component  
4 constructed fares.

1     40.       The computer program product of claim 35 further  
2 comprising instructions that cause a computer to:  
3           evaluate entries in fare construction tables to  
4 determine whether constructed fares in the set of constructed  
5 fares are valid constructed fares; and  
6           return the valid constructed fares as the set of  
7 constructed fares.



8 41. The computer program product of claim 40 wherein  
9 instructions that cause a computer to evaluate entries further  
10 comprises instructions that cause a computer to:  
11 determine if an entry in a fare construction table was  
12 memoized before accessing the fare construction table; and  
13 if the entry was memoized, retrieve an answer from a  
14 store of memoized entries to apply to the constructed fare.

1 42. The computer program product of claim 35 wherein  
2 instructions that cause a computer to determine interior cities  
3 comprises instructions that cause a computer to:  
4 access a first hash table by an airline, interior-city  
5 pair to return a list of gateway cities for which an airline has  
6 arbitraries that specify the interior city; and  
7 wherein instructions that cause a computer to  
8 search for gateway cities comprises instructions that cause a  
9 computer to:  
10 access a second hash table by an airline, gateway  
11 pair to return a second list of gateway cities that an airline  
12 publishes fares from the determined gateway to another gateway  
13 city.

1 43. A computer system comprising:  
2 a processor;  
3 a memory for storing instructions executed by the  
4 processor; and  
5 a storage medium storing a computer program product for  
6 producing a set of constructed international fares for an  
7 airline, the computer program product comprising instructions  
8 that cause the processor to:  
9 determine interior cities that appear with gateway  
10 cities in arbitraries for the airline;

11 search for gateway cities corresponding to the  
12 determined interior cities appearing in the  
13 arbitraries; and  
14 apply each arbitrary corresponding to each of the  
15 determined interior cities to published fares involving  
16 the gateway cities to produce the set of constructed  
17 fares.

1 44. The computer system of claim 43 wherein the system is a  
2 stand-alone computer.

1 45. The computer system of claim 43 wherein the system is a  
2 server computer in a networked, client-server computer system.

1 46. The computer system of claim 43 wherein the system is a  
2 client computer in a networked, client-server computer system.

1 47. A method of evaluating constructed fares against  
2 construction tables comprises:  
3 forming a query to obtain a record from a construction  
4 table to evaluate the validity of a constructed fare;  
5 determining whether the query has been stored in a  
6 store of past queries and associated answers;  
7 if the query has been stored, retrieving the answer  
8 from the store to evaluate the constructed fare, otherwise  
9 retrieving the record from a remote database;  
10 evaluating the constructed fare against the record; and  
11 storing an answer from evaluating the constructed fare  
12 for future references.

1 48. The method of claim 47 wherein the store is a

2 memoization store.

1 49. The method of claim 47 wherein once the answer for a  
2 certain query has been stored, the procedure does not need to be  
3 run again on that query unless the record changes.

1 50. The method of claim 47 wherein the construction table  
2 is a so called ATPCO P02 table.

1 51. The method of claim 47 wherein the construction table  
2 is a so called ATPCO P04 table.